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MEMOIRS  
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*Figures and Descriptions*

ILLUSTRATIVE OF  
BRITISH ORGANIC REMAINS.

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DECADE IV.  
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## BRITISH FOSSILS.

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### DECADE THE FOURTH.

ALL the plates and descriptions in this Decade are devoted to fossil Echinodermata of the order *Echinoidea*.

The genera selected for illustration are *Temnechinus*, *Acrosalenia*, *Hyboclypus*, *Hemipneustes*, *Ananchytes* with its section *Holaster*, and *Cardiaster*. The geological age of the first is Upper Tertiary, of the second and third Oolitic, of the remainder Cretaceous. Several of the species are represented for the first time.

*Temnechinus* is a genus remarkable for its species being at present known only as fossils of the Coralline and Red Crag; it is now characterized for the first time.

The examples of *Acrosalenia* selected are both remarkable for their beauty and their very perfect condition. They are also of much interest, one on account of the rectification of its true generic position, which I have been enabled to make through the aid afforded by very perfect specimens: the other, because of the complete preservation exhibited by the specimens described of parts too often lost in fossil Echinoderms. I have appended to the descriptions of these *Acrosalenia* brief characters of some new species of this interesting oolitic genus.

*Hyboclypus* is illustrated by the finest and largest species of the genus, one discovered during the researches of the Geological Surveyors.

*Hemipneustes*, to which genus I unite *Toxaster*, is now for the first time authentically represented by a British example, remarkable for its novelty and for the light it throws upon the mutual affinities of those genera of *Echinoidea* which have excentric mouths.

The well known genus *Ananchytes* is combined (as indeed it was formerly by Lamarek) with *Holaster*. In selecting the common *Ananchytes ovata* of the Chalk for the subject of a plate and description, I have been influenced by the necessity of clearing up the confused synonymy of this fine fossil, and of settling the numerous spurious species which have been constituted out of its varieties, or from imperfect figures contained in old works.

*Cardiaster* is a new genus, lately constituted by myself for some remarkable and interesting sea-urchins, intermediate in their characters between *Ananchytes* and the true *Spatangida*. To the account of the species figured I have added notices of all the forms of this curious type which are known to me as British.

EDWARD FORBES.

October, 1852.

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# BRITISH FOSSILS.

## DECADE IV. PLATE VIII.

### ANANCHYTES (HOLASTER) PILULA.

[Genus ANANCHYTES. LAMARCK. (Sub-kingdom Radiata. Class Echinodermata. Order Echinoidea. Family Ananchytidæ.) Body orbicular, oblong or obscurely cordate, tumid, with homogeneous ambulacra convergent on the vertex, all plane or with the anterior ambulacrum only lodged in a shallow furrow. No fascioles. Vent terminal, marginal or supra-marginal. Apical disk elongated, and composed of four perforated genital and five perforated ocular plates. Tubercles perforate, their bosses crenulate. Spines minute. No dental apparatus.

Subgenus HOLASTER. Body subcordate, vent terminal, supra-marginal.]

DIAGNOSIS. *A. ambitu vix cordato ; testâ altâ hæmisphæricâ tumidâ inferne planatâ ; ano alto.*

SYNONYMS. *Ananchytes pilula*, LAMARCK. An. sans Vert., vol. iii. p. 27.

*Spatangus prunella* ? MANTELL, Geol. Sussex, p. 193, pl. 17, f. 22, 23.

*Spatangus pilula*, DESMOULINS, Tabl. Syn. des Echin., p. 406.

*Ananchytes analis*, ROEMER, Norddeutsch. Kr. p. 35, pl. 6, f. 18.

*Holaster pilula*, AGASSIZ, Cat. Syst. p. 1. AGASSIZ and DESOR, Cat. Raisonné des Echin., in Annales des Sc. Nat. 3d ser., vol. viii. p. 29. FORBES, in Dixon's Geol. Sussex, p. 341, pl. 24. f. 10, 12 (junior).

*Holaster coravium* ? FORBES (not of Lamarck), in Dixon's Geol. Sussex, p. 342, pl. 24, f. 7-9.

Body oblong, lofty, always elevated, but not always to the same degree, tumid above, flattened below, and with sharply angulated sides, anteally obtuse and flattened, posteriorly abruptly truncate, vertex slightly in front of apical disk ; postéal interambulacral area highly arched in the dorsal region and slightly carinated, projecting over the oblong or round vent, which is placed at a considerable elevation, usually about half-way up the total height. Dorsal portions of the ambulacra quite plane ; in some examples the lower part of the anteal or odd ambulacrum is slightly excavated. Plates of the ambulacra large and broad, each equalling as much or rather more than half the height of an interambulacral plate. In a rather large example of this species there are 17 dorsal plates in each

vertical row of the odd ambulacrum, about 14 and 13 respectively in the rows of each lateral ambulacrum, and 7 in each vertical row of each lateral interambulacrum. These plates all bear minute scattered primary tubercles, with interspersed granules. The margins of the plates are in some examples slightly prominent, and as if marked by a bordering line; more usually they are quite plane, and occasionally slightly impressed. Beneath, the mouth is placed very near the anteal extremity, at about or less than one fourth of the length of the test from the margin, which in the region of the odd ambulacrum is slightly sinuous. The two posterior ambulacra are necessarily much longer than the others below, and proceed from near the hinder extremity to the mouth, their course marked by a slight depression. Their plates become elongated and polygonal, and though thickly strewn with granules bear very few primary tubercles. These last are more developed on the escutcheon-like area formed by the ventral portion of the odd or posterior interambulacrum. The mouth itself is roundish or ovate, its fore lip is depressed, its hinder lip tumid and elevated but not overlapping. The apical disk is with difficulty distinguished from the neighbouring plates; it is much elongated, its genital and ocular pores are minute, and the madreporiform body not very strongly marked. On flint casts the four genital pores are usually strongly impressed, as also are the pores of the avenues, which form homogeneous rows indistinctly indicated, owing to their distance from each other, and their minuteness.

The varying proportions of this species may best be illustrated by the following comparative measurements (in inches and parts of inches), of six specimens of slightly different bulk.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Height -	$0\frac{8}{10}$	$0\frac{5}{8}$	$0\frac{1}{2}$	$0\frac{1}{2}$	$0\frac{1\frac{1}{2}}{10}$	$0\frac{1\frac{1}{2}}{12}$
Length -	1	$0\frac{8}{10}$	$0\frac{7}{10}$	$0\frac{8}{10}$	$0\frac{6}{10}$	$0\frac{1\frac{1}{2}}{12}$
Breadth -	$0\frac{8}{10}$	$0\frac{7}{10}$	$0\frac{7}{10}$	$0\frac{6}{10}$	$0\frac{6\frac{1}{2}}{10}$	$0\frac{9}{12}$
Height of vent above margin }	$0\frac{3}{10}$	$0\frac{3}{10}$	$0\frac{2}{12}$	$0\frac{2}{12}$	$0\frac{2}{12}$	$0\frac{2}{10}$

I believe there is little doubt of this pretty urchin being the *Ananchytes pilula* of Lamarck, whose brief diagnosis "*A. minima*, "*ovato-globosa, subtus convexiuscula, ano in summo margine*,"



is a very insufficient description. Dr. Mantell, who was the first to notice it in England, referred it with a doubt to the *Spatangus prunella*, at the suggestion of the late Mr. König. With the latter fossil, however, which is a very curious species of *Hemiaster* well known at Maestricht, it has no near affinity. Roemer has given a good figure of the true type under the name of *Ananchytes analis*. Its aspect and the arrangement of its ambulacral plates are strikingly those of an *Ananchytes*, whilst the position of its vent is that of an *Holaster*. I regard it as a link between the groups, both being sections only of one natural genus. In some examples of this fossil the minute granules towards the side margins show a tendency to collect into a fasciole, a feature indicative of an affinity with *Cardiaster*.

*Locality and Geological Position.* In the Upper Chalk of Kent, Sussex, and other English counties.

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#### EXPLANATION OF PLATE VIII.

- Figs. 1. to 6. Various views of adult examples.  
 Figs. 7. and 8. Flint casts.  
 Fig. 9. A half grown example.  
 Figs. 10. to 13, young specimens.  
 Fig. 14. Ambulacral and interambulacral plates from the sides.  
 Fig. 15. The apical disk.  
 Fig. 16. The mouth.  
 Fig. 17 The vent, with its ossicles.

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